UNIVERSITY NEWS

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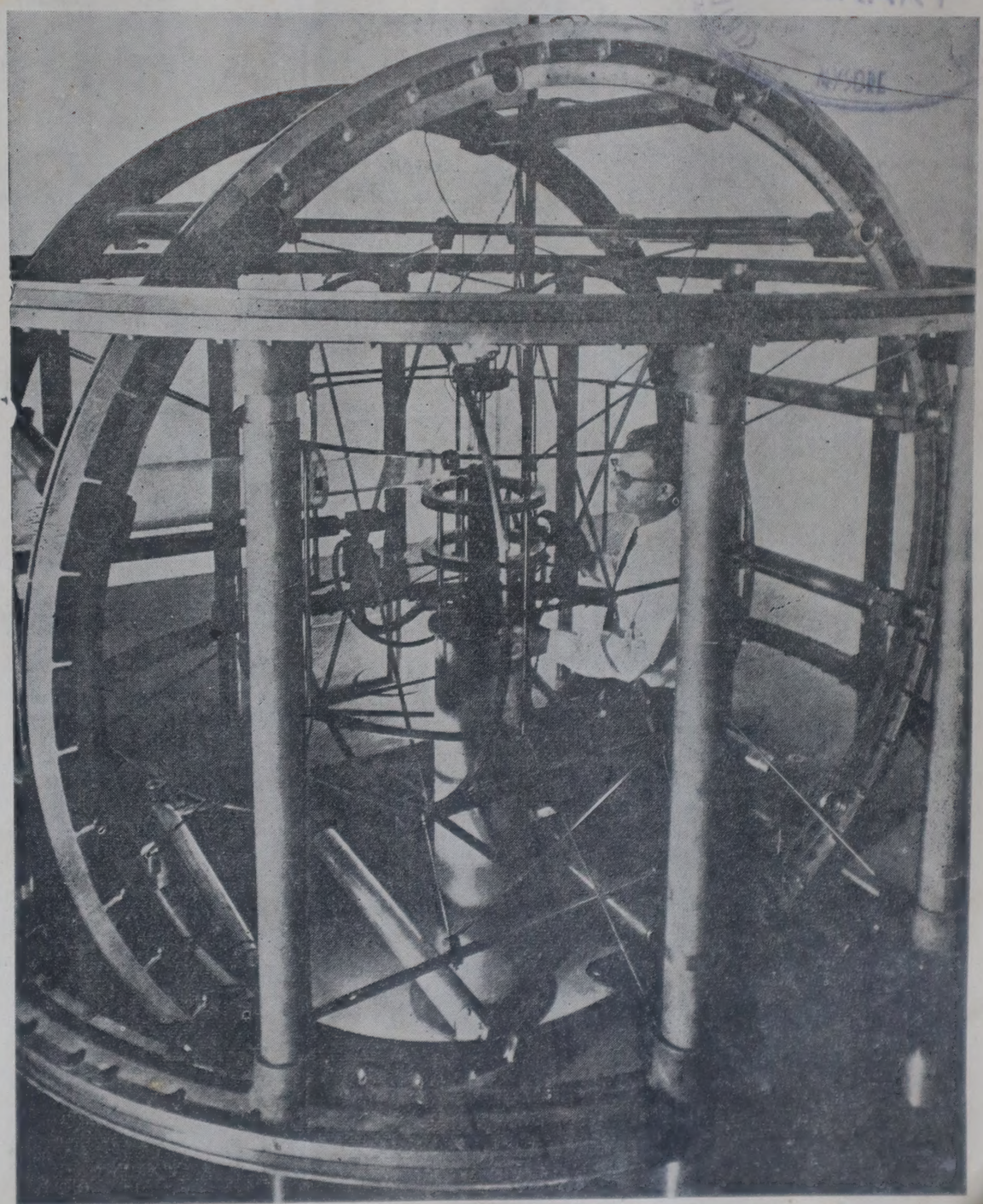

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India and Germany—Partners in Progress

UNIVERSITY NEWS
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In This Issue

PAGE

1. Challenge Before Scientists 3
2. BHU Makes Rapid Strides in Science 4
3. Science Congress in India's Progress 5
4. Atma Ram Decries Scientists' Craze 7
5. National Laboratories' Contribution in Development 9
6. Indian Science Congress Sectional Presidents 10
7. Nehru's Role in Scientific Growth 17

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Challenge Before Scientists

SCIENCE in India faces an uphill task. Since independence it has been playing increasing role in our national progress, welfare and security. Planned growth in research and technology is vital for the future developmental schemes of this country. Realising this, the National Planning Committee attached prominent place to science in the scheme of things in this country. Jawaharlal Nehru who had an unflinching faith in science told the committee : "...it is science alone that can solve the problems of hunger and poverty, of sanitation and illiteracy, of superstition and deadening custom and tradition, of vast resources running to waste, of a rich country inhabited by starving people... Who indeed could afford to ignore science today ? At every turn, we have to seek its aid... the future belongs to science and to those who make friends with science." This statement of Nehru eventually led to the framing of the Science Policy and Nehru's hopes and aspirations were incorporated in the Scientific Policy Resolution in 1958. The scientists in India were thus entrusted with a Herculean task of meeting the challenge of ameliorating the economic lot of our people.

Keeping this in view, the Government established an elaborate net-work of national laboratories and in course of time, science budget has jumped from Rs. 10 crores to about Rs. 60 crores. Laboratories in our universities have also been immensely strengthened. It is, therefore, pertinent to ask as to what concrete role science has played in the development of agriculture, industry, transport and means of communication. The fact that most of the countries in the world add annually about Rs. 450 in their per capita income and we add only Rs. 50 is an index of our tardy scientific progress. What Prime Minister Indira Gandhi said recently is a stark truth: "Under the inspiration of Jawaharlal Nehru, the Government had adopted the Scientific Policy Resolution in 1958 and there we stopped." This is indeed a sad commentary on the state of affairs which needs to be stemmed immediately.

India faces a large number of economic and social problems of various dimensions. To combat with these problems, Dr Atma Ram, Director-General, Council of Scientific and Industrial Research, has befittingly remarked that the scientists should take research to the door of the common man. India's galloping population calls for immediate measures for birth control, the primitive tools and implements used in agriculture and industry need to be modernised, urgently and our educational system and set-up requires revolutionary changes, our agricultural progress hinges on rains, the fields do not produce enough to feed our millions, we have to spend annually Rs. 250 millions on import of food and there is persistent scarcity of necessities like sugar, kerosene etc' India is a huge country with vast resources : all land is not cultivated, our resources on sea, mountains and rivers have remained untapped. These are some of the problems which stare at us and call for immediate action. The earlier the scientists come to grips with these problems, the better for the country.

With rising cost of scientific equipment, to increase return on investment, a wise choice of what to invest in, a level of technology and efficient management should lead to meaningful research, development, design, production and manufacture. This needs personal contribution from all men of science and it alone can help us realise what Prof. Blackett calls fulfilment of Jawaharlal Nehru's goal of scientifically minded, united, peaceful and prosperous India. The scientists, therefore, will have to ponder over the ways and means to execute Nehru's dreams.—*M.R.D.*

BHU MAKES RAPID STRIDES IN SCIENCE

By A. C. Joshi

Banaras Hindu University, the venue of the 55th session of the Indian Science Congress Association, has a proud record of contribution in advancement of science and technology in the country. Established over 50 years ago, the university has greatly enriched research in various fields of science. Some of the departments of university have been playing eminent role in training personnel for the Governmental institutions like the Oil and Natural Gas Commission. The writer of the article, Dr A. C. Joshi, the Vice-Chancellor, who was associated with the expansion of the university in early years also, has taken keen interest in the development of science and technology departments. He looks forward hopefully towards "making still greater contributions to the development of science, agriculture, medical sciences and industry in the coming years."—Ed.

WITH the Central Hindu College at Kamachha as its nucleus the Banaras Hindu Univesity started functioning on October, 1 1917. The college was then imparting instruction to students up to the M.A. and M.Sc. standards, but there were only two departments of science, physics and chemistry. The teaching of biology in B.Sc classes started in 1918. Since then the university has been growing steadily. At present, there are 34 departments of science, medicine, agriculture, technology and engineering with nearly 4,000 students on their rolls.

Mahamana Pt. Madan Mohan Malaviya, the founder of the university, was a man of great foresight and vision. He realised long ago and before any other national leader that the future of the country depended on the acquisition of good knowledge of science and technology and made special efforts to provide facilities for education and research in the various branches of the same.

As early as 1919, the engineering College was established in the present university campus and by 1923 this college came to have the departments of mechanical and electrical engineering, mining and metallurgy and geology. In 1926, the department of civil engineering was also added.

The Central Hindu College at Kamachha with all its departments was shifted to the present university campus in newly-constructed buildings in 1921. The department of physics, chemistry, botany, zoology and industrial chemistry were then housed in the two buildings which are now occupied by the departments of physics, chemistry, geography and spectroscopy.

In 1927, the department of Ayurveda which was a part of Oriental Learning, became a separate College of Ayurveda. This college has now grown into the College of Medical Sciences with 15 departments, one of the most prominent of which is Post-Graduate Institute of Ayurveda.

In 1931, the Institute of Agricultural Research was established, which was raised to the College of Agriculture in 1946.

Separate College

The departments of science functioned under the Central Hindu College until 1935, when they were constituted into a separate College of Science. The departments of ceramics and glass technology and pharmaceutics were established in 1936 and 1937, respectively, under the auspices of this college.

In 1939, a separate College of Technology was formed comprising the departments of industrial chemistry, glass and ceramics and pharmaceutics. These departments were later reorganized as the departments of chemical engineering, silicate technology and pharmaceutics.

A brief account of the contributions of the different departments is given below :

Botany : The department of botany is well known for its contributions to morphology, physiology, ecology, mycology and algology. Post-graduate studies were initiated in 1919 by late Prof. B. Sahni. His successor, Prof. R. S. Inamdar, advanced the knowledge of respiration, water relations, translocation of water and nutrients and physiology of growth. The late Prof. Y. Bhardwaja subsequently developed a school of algal morphology, which has now extended its activities to cover even the biochemistry, cytology, cytotaxonomy and cytogenetics of algae.

A centre for the study of the morphology of angiospherms was established by Dr. A. C. Joshi during the years 1931-45. Much work was published on the anatomy, embroylogy and cytology of numerous taxa. The nature of the flower and carpel was critically examined. After Dr. Joshi left the department research work on angiospherm received a set-back though Prof. N. K. Tewari continued working on the embryology of *Engenia*. Recently, Dr. S. K. Roy has revived the interest in such studies, and particularly in myrfaceae. He is also interested in cytological and taxonomic studies of the ferns.

Ecological research in the university has been established by Prof. R. Misra, who has advanced our knowledge in several directions such as floristic, vegetational analysis of specialized habitats, autecology of herbs, grasses and trees, ecotypic differentiation, the concept of plant succession and ecosystem, and production and radiation ecology. Over thirty students have been awarded Ph. D. degree under his guidance and five under the guidance of Prof. K. C. Misra who is another active worker in this branch of botany. Over 30 research scholars are working on various aspects of ecology.

(*Contd. on page 19*)

Glorious Record of Science Congress in India's Progress

IN the overall development of the scientific research in India the Indian Science Congress Association has played a prominent part. Leading scientists who have been associated with it have done, guided and promoted research in the various fields. The association has been consulted by the Government of India in the numerous scientific matters from time to time. Eminent men of science like Sir Ashutosh Mookerjee, Sir P. C. Ray, Sir C. V. Raman, Prof. B. Sahni, Dr. H. J. Bhabha and several others in India and abroad have conducted and guided its deliberations.

The Association has been holding annual sessions where scientists meet and assess the scientific achievements of the year.

Established in 1914, the Indian Science Congress Association is the most broad based scientific society of India. This association organises an annual Science Congress in January, where scientists of diverse disciplines as also, those academically or culturally interested in the advancement of science meet. The Indian Science Congress has gradually flowered into an internationally recognised scientific conference.

The idea of establishing such an organisation was developed in two meetings held in the premises of the Royal Asiatic Society of Bengal (now Asiatic Society) in Calcutta on November 2, 1912, and November 20, 1913, and the Indian Science Congress Association came into being.

Objects of the Association

From the very beginning, the association was conceived as an all-India organisation covering as many disciplines of science as possible and bringing within its fold both senior and junior scientific workers as also people interested in the progress of science. The objects of the association are: (*a*) To advance and promote the cause of science in India; (*b*) to hold an annual congress at a suitable place in India; (*c*) to publish such proceedings, journals, transactions and other publications as may be considered desirable, (*d*) to secure and manage funds and endowments for the promotion of science, including the rights of disposing of, or selling all or any portion of the properties of the association; (*e*) to do and perform any or all other acts, matters and things as are conducive to, or incidental to, or necessary for, the above objects.

In keeping with its objectives, the membership of the association is open to all persons and organisations interested in the advancement of science in India.

First Congress and After

The first session of the Indian Science Congress was held in the premises of the Asiatic Society in Calcutta from January 15 to 17, 1914, under the auspices of the University of Calcutta. The Congress was presided over by Ashutosh Mookerjee, the then Vice-Chancellor of the university. One hundred and five scientists from different parts of India assembled at this conference where 35 papers were read in six different sections, namely, those of chemistry, physics, geology, zoology, botany and anthropology.

In relation to the present stature of the Science Congress, whether it is in respect of the size of attendance or the number of papers presented, the progress achieved is revealing. Now the audience at the inauguration ceremony in respect of a session of the Science Congress numbers more than 5,000 and more than half of them are delegates or participants in the scientific programme of the session including a number of distinguished delegates from scientific academies of other countries. The number of papers presented exceeds 1,600 and several specialised symposia and special popular science lectures are arranged. The Congress is held in 13 sections, namely, (1) mathematics, (2) statistics, (3) physics, (4) chemistry, (5) geology and geography (6) botany, (7) zoology and entomology, (8) anthropology and archaeology, (9) medical and veterinary sciences, (10) agricultural sciences, (11) physiology, (12) psychology and educational sciences, and (13) engineering and metallurgy.

Silver Jubilee

The silver jubilee session of the Indian Science Congress, which was held in Calcutta in 1938, started a new chapter in the history of its growth. Historic in its composition, it was a joint meeting of the Indian organisation and its counterpart in Britain, the British Association for the Advancement of Science. Lord Rutherford was to have presided over this session; but due to his sudden and premature death, Sir James Jeans took the chair. It was at this Jubilee Session that the participation of foreign scientists from various countries abroad was initiated.

Between 1939 and 1946, it was not, however, possible for the association to arrange for the participation of foreign scientists in the Science Congress, mainly owing to lack of funds. But in January 1947, on the eve of independence, the association was able to invite foreign scientists from various countries to take part in the Science Congress in Delhi, which was held under the presidentship of the Prime Minister of the then interim Government of India, late Jawaharlal Nerru. This session marked the beginning of a new era in which attendance of foreign scientists at the annual Science Congress bringing it to the level of an international scientific conference, has become a regular feature. Nehru's personal interest in the development of science in the country had helped the association to promote scientific enthusiasm, particularly among

younger workers, and scientific awareness in the country generally.

Asiatic Society and the National Institute of Science

It was in the premises of the Asiatic Society that the Indian Science Congress Association was born and held its first conference there. For 25 years from 1914, the affairs of the Indian Science Congress were looked after and managed by the Asiatic Society. The only separate identity that was maintained was in the matter of publication of the proceedings of the annual Science Congress, which were printed separately from those of the Asiatic Society. The association thus owes its origin as also its nurture to the Asiatic Society.

Just as the Indian Science Congress Association is an off-spring of the Asiatic Society, the National Institute of Sciences of India is an offspring of the Indian Science Congress Association. The idea of establishing this premier body of Indian scientists was mooted and accepted at the Bombay session of the Science Congress in 1934. It was given a concrete shape in the following session held in Calcutta in 1935 when the National Institute of Sciences of India was established.

With endeavours started in 1952-53, the association had its own headquarters buildings constructed at 64, Dikhusa Street, Calcutta-17, in 1962. The office of the association is located in this building.

New Publications

Due to the national emergency declared in 1962 the Science Congress did not celebrate its golden jubilee in 1963. But the 50th session of the Congress was held in October 1963, and to mark the occasion, the association brought out two special publications—(1) "A Short History of the Indian Science Congress Association (with life-sketches of general presidents)" and (2) "Fifty Years of Science in India". The second volume is divided into sectional reviews covering progress made in different branches of science.

General Presidents

With the end of the current year and with the holding of the next Science Congress in January 1968 the Association will step into its 56th year. It may be worthwhile in this connection to recall the names of those eminent men of science who have in successive years presided over the different sessions of the Science Congress since its inception. They represent a galaxy of the devoted men of science, many of whom, though not of Indian origin, have given their life's labour for the advancement of science in India.

The following is the list of the general presidents with years in brackets indicating the order of their presidentship :

Sir Ashutosh Mookerjee 1(914),
Dr. W. B. Bannerman (1915);
Sir Sydney Burrard (1916);
Sir Alfred Gibbs Bourne (1917);
Dr. Gilbert T. Walker (1918);
Lt. Col. Sir Leonard Rogers (1919);
Sir Prafulla Chandra Ray (1920);
Sir Rajendra Nath Mookerjee (1921);
Mr. C. S. Middlemiss (1922);
Sir M. Visvesvaraya (1923);
Dr. N. Annandale (1924);
Dr. M. O. Forster (1925);
Mr. A. Howard (1926);
Sir J. C. Bose (1927);
Dr. J. L. Simonsen (1928);
Sir C. V. Raman (1929);
Col. S. R. Christophers (1930);
Lt. Col. R. B. Seymour Sewell (1931);
Lala Shiva Ram Kashyap (1932);
Dr. L. L. Fermor (1933);
Dr. M. N. Saha (1934);
Dr. J. H. Hutton (1935);
Sir U. N. Brahmachari (1936);
Sir T. S. Venkatraman (1937);
Lord Rutherford of Nelson (President of 1938 Session who died prematurely)
Sir James H. Jeans (1938)
Sir J. C. Ghosh (1939);
Prof. B. Sahni (1940);
Sir Ardeshir Dalal (1941);
Dr. D. N. Wadia (1942 and 1943 in the absence of Jawaharlal Nehru)
Prof. S. N. Bose (1944);
Sir S. S. Bhatnagar (1945);
Prof. M. Afzal Husain (1946);
Jawaharlal Nehru (1947);
Col. Sir R. N. Chopra (1948);
Sir K. S. Krishnan (1949);
Prof. P. C. Mahalanobis (1950);
Dr. H. J. Bhabha (1951);
Dr. J. N. Mukherjee (1952);
Dr. D. M. Bose (1953);
Dr. S. L. Hora (1954);
Prof. S. K. Mitra (1955);
Dr. M. S. Krishnan (1956)
Dr. B. C. Roy (1957);
Prof. M. S. Thacker (1958);
Dr. A. L. Mudaliar (1959);
Prof. P. Parija (1960);
Dr. N. R. Dhar (1961);
Dr. B. Mukherji (1962);
Prof. D. S. Kothari (1963);
Prof. Humayun Kabir (1964-65);
Prof. B. N. Prasad (1966);
Prof. T. R. Seshadri (1967);
Dr. Atma Ram (President for 1968 session)

Popularity

With new discoveries and developments in science, it is getting increasingly difficult to demarcate the border of one branch of science from another, and catering as it does, not only to scientists of different disciplines but also to those who have any cultural interest in science, the association is bringing within its fold larger number of people every year. It's popularity has, therefore, been continuously on the increase.

This is not a specialised society nor is it an academy of science to directly organise and foster researches. It's chief aim is to stimulate the urge of people towards taking to education and research in science, and this is sought to be mainly done by organising an annual conference in as broadbased a manner as possible arranging popular science lectures at different places and undertaking allied activities.

It is obvious that in the matter of furtherance of the objectives of the association, the encouragement to the younger ones among men of science has to be uppermost in mind, and the association naturally provides the widest possible scope to the young scientific workers to present in the form of papers what they do in their respective fields of work.

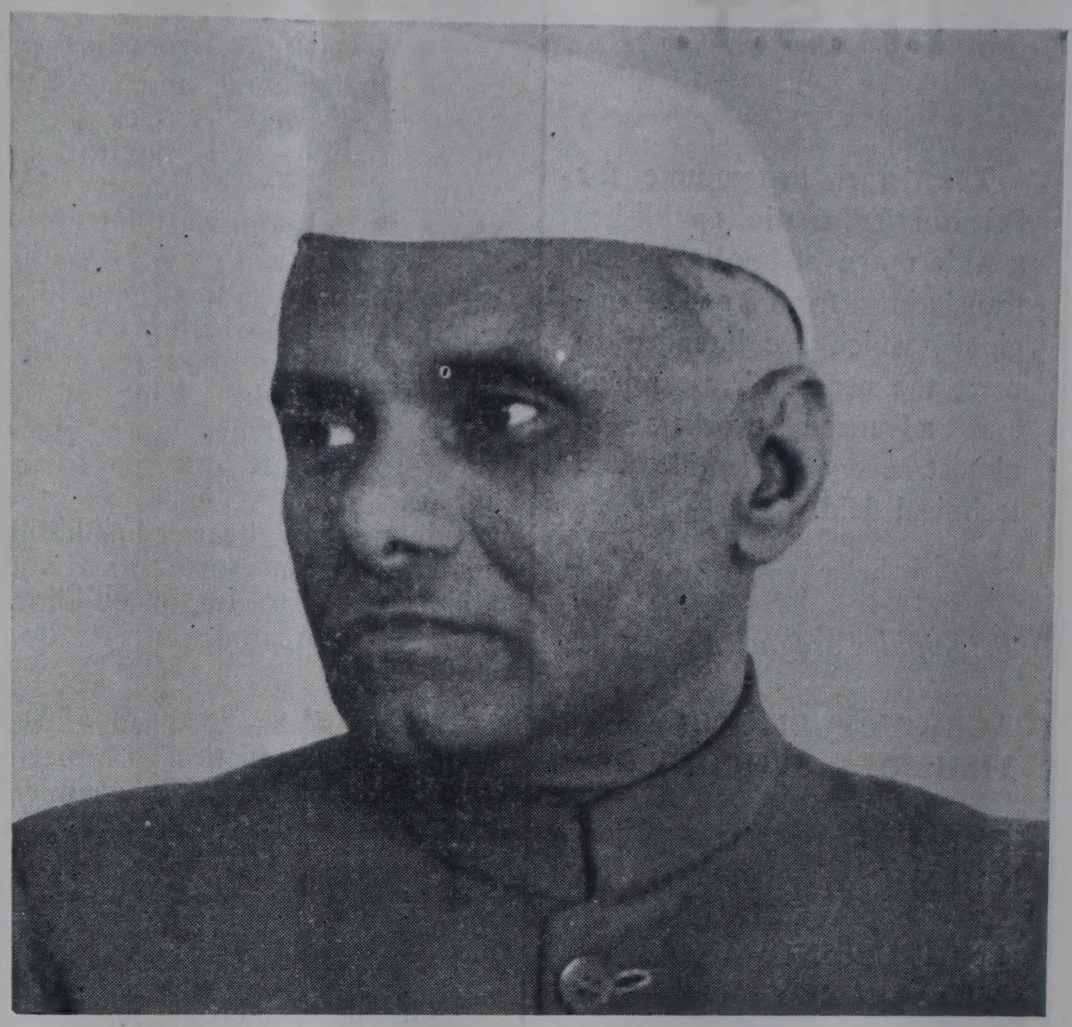
ATMA RAM DECRIES SCIENTISTS' CRAZE TO GO ABROAD

THAT he has worked his way the from position of a research scholar to the high office of Director-General of the Council of Scientific and Industrial Research speaks of Dr Atma Ram's love for hard work and erudition. His appointment as the General President of the 55th session of the Indian Science Congress Association is a tribute to his earnest devotion to the cause of science.

Dr Atma Ram joined the Council of Scientific and Industrial Research which is country's premier body to promote, organise, and administer scientific research, in August 1966. The 30 national laboratories which are controlled by the CSIR are engaged in myraid type of scientific research in various fields. Dr Atma Ram believes that our laboratories have "the right to exist only when they add to the overall welfare of the country. The impact of scientific research should be quickly visible in our industrial growth", he says.

Dr Atma Ram who is convinced that scientific talent in our own country is not inferior to any country's in the world, however, feels immense vacuum in original contribution by Indian research workers. He has a remedy for this and suggests that "we must follow Japan". Although completely annihiliated by war, Japan has developed what he calls "technological competence", at an amazingly top speed. She has excelled in industrial production and out-stripped the world's supreme powers like the US.A. and the U.K.

This has been accomplished, according to Dr Atma Ram, "by purchasing knowledge from scientifically advanced nations." Dr Atma Ram advocates that our salvation lies in following Japan. And like Japan, we must take to "adoptation research" as quickly as possible. For this, indigenous material in India is enough and training in foreign laboratories is not essential", he opines. He has had all his scientific training in India and deprecates young scientists' tendency for going aborad.



Dr. Atma Ram, D.Sc., F.N.I., General President of 55th session of Indian Science Congress, to be held at Banaras from January 3 to 9, 1968.

Born and brought up in the remote village of Pilana (in Bijnor district in U.P.), Dr Atma Ram studied privately for his high school examination and secured meritorious position with Persian and Urdu. However, after that he took to science and topped in the M.Sc. (chemistry) examination of Allahabad University in 1931. Soon after, he was offered a junior scholarship and commenced his work for doctorate which came in 1936 from the same university. His main field of research was "the physical chemistry of photochemical reactions, and presence of formaldehyde and mechanism of its origin in the upper atmosphere."

Dr Atma Ram started his career as a member of the research team, directed by the late Dr. S. S. Bhatnagar, in the Indian Industrial Research Bureau and subsquently joined the Council of Scientific and Industrial Research in 1936. He did splendid work at the bureau on the production of air-foam solution for controlling, petrol fires, and numerous war problems at that time.

In 1945, the governing body of the CSIR entrusted to him the responsibility of organizing the newly-started Central Glass and Ceramic Research Institute at Calcutta. He was appointed secretary of the Glass and Ceramic Research Institute Commitee to initiate the institute. After holding successively the positions of officer-in-charge and joint director, Dr Atma Ram was appointed director of the institute in 1952. Under his inspiring leadership, the institute which started from a scratch soon established the entirely indigenous technology of producing optical glass in India and has been producing optical glass since 1960 in quantities sufficient to meet the entire requirements of the country. In fact, under his dynamic steward-

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ship, the institute achieved outstanding reputation for quality and variety of its work among industrial research institutes in India and abroad.

Dr Atma Ram's contributions cover fundamental and applied sciences as well as technology of production. His meritorious scientific accomplishments include the development and production of optical glass, a vitally strategic material, the technology of production of which is a closely guarded secret of about ten countries in the world. Some of his scientific researches have given birth to entirely new industries in the country, such as the production of heat insultaing materials from waste mica and foam glass for use in building, cold storage and refrigeration industries.

His work has also led to the indigenous production of hitherto imported articles like chemical porcelain, glass electrodes for PH metres, coloured glasses, sun-glare glasses, ceramic and vitreous enamel colours and stains, and special refractories.

Of his numerous researches in fundamental silicate sciences, special mention may be made of his studies on the origin of colour in copper-red glasses. He found that the formation of cuprous oxide colloid led to the copper red colour in glasses and not the copper colloid as was believed earlier by the scientists all over the world. This discovery helped the substitution of importeds elenium in the production of red bangles, one of the biggest cottage industries in the country.

Dr Atma Ram is, by conviction, a firm believer in indigenous products for the progress of the nation, and from the very inception of the Central Glass and Ceramic Research Institute, he shaped its programme dedicated to making the country self-reliant in the field of glass and ceramics. For his distingusihed services to the country, he was honoured with the Presidential Award Padam Shri in 1959.

Dr Atma Ram was elected to the fellowship of various important scientific institutions in the country and abroad.

Recently Dr Atma Ram was honoured with the award of the honorary degree of Doctor of Technology in Chemical Sciences by the Lenin Soviet Technological Institute of Leningrad, USSR, for his great contribution in the development of chemical sciences. He is the first recipient (1959) of the Santi Swarup Bhatnagar Medal, the highest distinction in the field of physical and technological sciences in India. He is also the first recipient of the gold medal and cash award of the Scientific Research Committee of Uttar Pradesh, and the K. G. Nai Gold Medal of Maharaja Sayajirao University of Baroda. He was the general secretary of the Indian Science Congress Association from 1962-1966 and the vice-president of the National Institute of Sciences of India since 1965.

Dr Atma Ram is the author of more than 70 research papers apart from a host of reviews and technical notes ; and a book in Hindi on History of Chemistry. He holds 25 patents.

Though overall in charge of research in India, Dr Atma Ram longs to be in the laboratory himself. After having worked in laboratories for 32 years, he considers experiment in the laboratories "as a torch to myself." This is why he is always more "concerned about the real research worker and the lab". Once fond of poetry, classical music and sports he is now hardly able to squeeze any time for such pursuits. Being in government office means a lot of paperwork, but when I met him in his office recently he had cleared all files. That was perhaps a scientist's way of cutting the red-tape. The recent broom-work in the CSIR set-up is the beginning of a large-scale operation of clearing the mess in this country's paramount body responsible for research which has gone a bit off the track.

—M. R. D.

National Laboratories' Contribution in Industrial Development

SCIENTIFIC research in India has a proud record. Numerous processes discovered and evolved in our laboratories have admirably contributed in fattening the gross national product. The Council of Scientific and Industrial Research certainly deserves kudos for efficiently organising and imaginatively promoting these investigations.

In recognition of its vital role in the industrial and economic development, scientific research received a great fillip in India after independence. A chain of research laboratories and institutes were set up in the country covering various fields of science and technology.

These laboratories and institutes which number 30 have carried out pioneering work in the development of technological knowledge for utilising the vast resources of the nation. During the last 15 years, several new products and processes have been developed by the laboratories and known processes and techniques modified to suit our needs. Some of these processes have opened avenues for economic utilisation of indigenous raw materials; some have been instrumental in establishing production of material which was hitherto imported or which would otherwise have to be imported. Some processes have provided material to strengthen and supplement our defence efforts, while others are likely to go a long way in increasing availability of products for internal consumption.

New Processes

As a result of the research and development efforts of these laboratories, 241 processes have been released to industry on royalty/premia basis or as technical aid against payment. Of these 105 processes are in actual production. Besides, there are 240 processes which are now ready for exploitation. The total value of products manufactured under the processes till March 1967 is estimated at over Rs. 148 million.

Persistent research conducted and promoted by national laboratories have already made a latent impact on the scientific and technological status of the country. But perhaps more vital is their contribution to the industrial development in terms of procuring data on indigenous materials such as coals, petroleum crudes, minerals and metals; evolving new techniques of processing or upgrading low-grade ores and minerals for fuller utilization; evolving vital components for radio, television and mechanical systems, and material and intermediates for drugs, paints, dyestuffs and perfumeries, and adapting processes to indigenous conditions.

For the growing electronics industry, the researches at National Physical Laboratory, New Delhi, have provided mica and ceramic capacitors and ferrites.

These components find their way into radio sets, telephone, radar, tape-recorder, computers, automatic process control devices and many other electrical and electronic equipments. The Central Electronics Engineering Research Institute, Pilani, has developed know-how for the manufacture of TV receivers mainly based on indigenously available material and components. The process has been released to two firms for a total capacity of 20,000 sets a year in the first instance.

Production of optical glass, a strategic material, is another achievement of the scientists of the Central Glass and Ceramic Research Institute, Calcutta. Optical Glass is a special type of homogenous glass used for lenses and prisms, in optical instruments such as microscopes, telescopes, binoculars and cameras, and in the optical devices of firing control and locating instruments employed in warfare. After the Second World War, the Central Glass and Ceramic Research Institute took on itself the uphill task of producing this strategic material and successfully manufactured it within two years.

At present, the Glass Institute plant is producing all the types of optical glasses, practically meeting the entire demand of the country. In respect of utilisation of waste material, mention can be made of mica insultaing bricks produced from waste mica used in iron-steel, glass pottery and many industries where high temperature furnaces are employed. This process has not only provided an economic utility of waste mica but has also saved the country from importing vermiculite for making dolamite bricks.

Utility Products

The National Chemical Laboratory, Poona, has developed new utility products like chemicals for drugs, dyes and perfumeries, certain ion-exchange resins, insecticides, and was from sisal waste. The Central Fuel Research Institute, Jealgore, has contributed to utilisation of low-grade coals and coalwashing; blending of coal and carbonisation : and development of metallurgical coke from non-coking coals. Utilising indigenously available material, the Central Drug Research Institute, Lucknow, has developed a process for preparation of meat extract concentrate and bacteriological quality peptone which are currently imported to meet the needs of pharmaceutical industry. The process has been taken up by two firms which are supplying peptone and meat extract to various institutions and factories. In the field of food, protein-rich compositions from groundnut flour, infant food based on buffalo milk, and improved rice milling techniques are the contributions of Central Food Technological Research Institute, Mysore.

Production of ferro-alloys, graphite crucibles and substitution of scarce materials like copper and nickel in new coinage alloy for the recently released 1, 2, and 3 paisa coins, by the National Metallurgical Laboratory, Jamshedpur; foam glass, special refractories, and signal glass by Central Glass and Ceramic Research Institute, Calcutta; air depolarised cells by the Central Electrochemical Research Institute, Karaikudi; activated carbons by the Regional Research Laboratory, Hyderabad, are some of the other items where import substitution has been achieved.

Technique

The economic technique of road construction using puzzolanic material by Central Road Research Institute, New Delhi, and research on prefabricated structures and roofs, by Central Building Research Institute, Roorkee, have helped in lowering costs considerably in civil engineering practice. The progress of leather industry has been greatly augmented by the researches on tanning agents, processing of hides and utilisation of tannery wastes by the Central Leather Research Institute, Madras. Exploitation of marine resources for valuable salts and algae is a significant contribution of Central Salt and Marine Chemicals Research Institute, Bhavnagar.

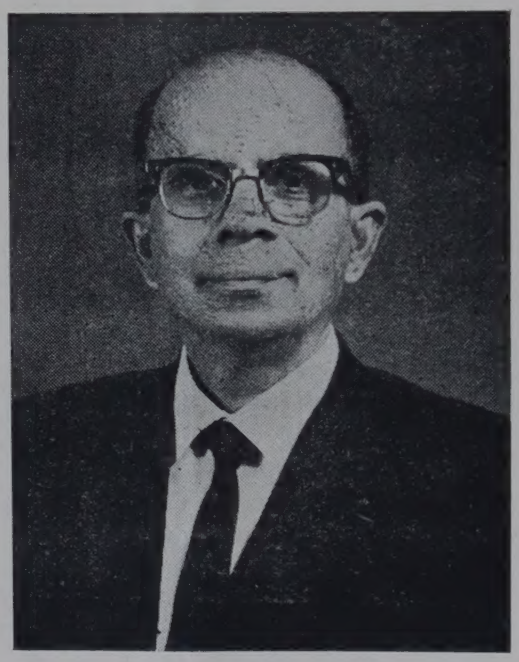
The Regional Research Laboratories at Hyderabad, Jammu and Jorhat, which were set up to cater to the specific research and development requirements of particular regions, have also developed a number of products and processes utilising local resources.

Under the inspiring of Dr Atma Ram stewardship, the Council of Scientific and Industrial Research is busy streamlining its research programme to make it problem-and-production oriented and creating necessary services and conditions for more effective utilisation of useful results of research conducted by the CSIR laboratories. It is also laying greater stress on development of technology which is essential for rapid industrial and economic development of the country.

Indian Science Congress Sectional Presidents

PIONEERING work in pure and applied chemistry by Prof. S. K. Bhattacharyya has immense possibilities of industrial significance. His prolonged research holds great scope in petrochemical and allied industries.

Professor S. K. Bhattacharyya who had his early education in the Universities of Calcutta and Dacca has a brilliant academic record to his credit. He worked in the same university for about six years as a research scholar, and later as an assistant lecturer under the guidance of late Sir J. C. Ghosh. He was awarded the Sir P. C. Ray prize in 1935 and the degree of Doctor of Science in physical chemistry in 1939 for his work in photochemistry.



Prof. S. K. Bhattacharyya
Chairman, Chemistry Section

He joined the Indian Institute of Science, Bangalore, in 1939, where he worked for about 12 years in different capacities and later as an assistant professor and head of the department of physical and inorganic chemistry. He joined the newly-created department of chemistry of the Indian Institute of Technology, Kharagpur in 1952. He has organised the department which has earned the reputation as one of the most modern and well-equipped ones both for under-graduate and post-graduate teaching and research.

For advanced training in the technique and experimentation of high pressure chemistry and also in catalysis, Dr. Bhattacharyya has worked in famous laboratories in London, Paris and Brussels. Since 1933, Prof. Bhattacharyya has been actively engaged in research work in pure and applied chemistry: catalysis, high pressure chemistry, photochemistry, chemical kinetics and electrochemistry. He has concentrated mainly in catalysis and high pressure chemistry.

Vapour-Gas Phase

Prof. Bhattacharyya has studied a large number of catalytic reactions in the vapour-gas phase involving oxidation, reduction, dehydration and dehydrogenation in both fixed and fluidised beds using as raw materials benezene, toluene, xylenes, crotonaldehyde, ethylene, picolines, etc. which have their origin in coal and petroleum to produce maleic acid, benzeldehyde, phthalic anhydride, maleic acid, ethylene oxide, and nicotinic acids, respectively.

The catalysts which have been developed are of great industrial importance. He has made an extensive study on the catalytic production of butadiene from ethyl alcohol by single stage and two-stage processes in fixed and fluidised beds. An excellent catalyst has been discovered which gives very high conversions to butadiene particularly in the fluidised bed.

He has also synthesized a large number of valuable organic acids esters from cheap raw materials like acetylene, carbon monoxide, etc. at high pressures, up to 1,000 atmosphere using halides of transition metals as catalysts.

Some of these processes will undoubtedly find important applications in petrochemical and coal chemical industries. He has also made detailed study of the kinetics of some of these reactions and suggested possible mechanisms and rate equations.

Prof. Bhattacharyya has for the first time proved the importance and usefulness of differential thermal analysis technique in the structural studies of a large number of single, binary and ternary oxide catalyst systems. In most of the cases, excellent correlations between thermal characteristics of the catalysts, their surface areas and catalytic activities have been found.

From his studies on chemisorption of oxygen, hydrogen and methanol vapour on oxide catalysts like vanadium pentoxide, silver oxide, zinc oxide and alumina and the consequent changes in their semiconductivity, he has drawn conclusions which are useful in the prediction of catalytic activity.

Prof. Bhattacharyya has written a book : "Some Catalytic Gas Reactions of Industrial Importance" with Dr. J. C. Ghosh and Dr. M.V.C. Sastri.

Prof. Bhattacharyya is at present professor of chemistry and head of the allied chemistry department in the Indian Institute of Technology, Kharagpur.

Statistics Section

Mr Hari Kinar Nandi obtained his M.Sc. degree in statistics from Calcutta University in 1943. Soon he joined the Indian Statistical Institute. He is now a reader in the departtment of statistics.

He has made special contributions in statistical inference and design of experiments. Besides, he has published a number of *critiques* on the Indian National Sample Survey, Statistical Orga nizations of India and other current problems of statistics.

He is a founder-member of the Calcutta Statistical Association and has been editing its journal : *Calcutta Statistical Asso-*

Mr. H. K. Nandi

ciation Bulletin, since its inception.

Agricultural Sciences Section

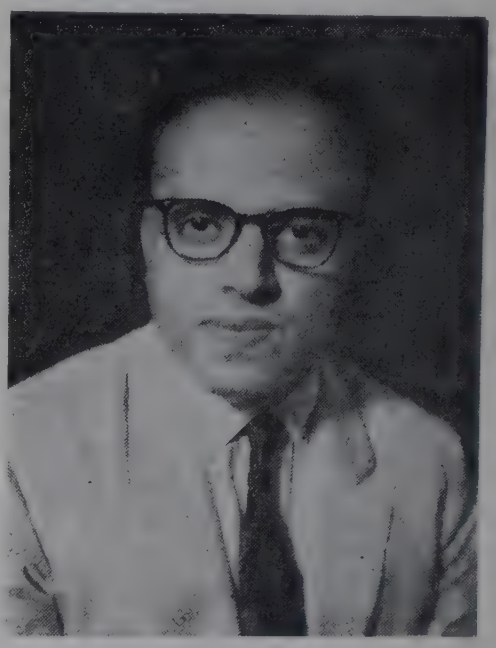
To immediately raise the output in our fields is a million-dollar question that has been engaging the first attention of agriculturists, scientists and politicians alike. A coterie of brilliant scientists have devoted themselves to this problem. And their investigations have yielded fruitful results also. Dr Swaminathan is one among such scientists.

Dr. Monkombu Sambasivan Swaminathan had his early education in Madras, New Delhi and the Netherlands. From the Cambridge University he secured his Ph. D. He worked at the University of Wisconsin, U.S.A., during 1952-53 as a project associate in genetics.

Dr. M. S. Swaminathan is a widely-known scientist for his outstanding contributions in the field of genetics. The "Swaminathan School" of radiation genetics is widely known for the pioneering work on the indirect effects of radiations and the use of atomic energy in crop improvement.

One of his important findings, which showed that irradiation of food and culture media leads to the generation of radio-mimetic compounds, has attracted the attention of radiation-food technologists all over the world. The recent demonstration by his group that the colour of the wheat grain can be speedily changed from red to amber and that the quantity and quality of proteins of wheat and rice can be improved very greatly through mutational manipulation have opened up hopes for facing successfully the problem of protein hunger. The wheat varieties developed by the use of mutageons and specially approved for release are 'sharbati sonora'.

Dr. Swaminathan conceive din 1962 the programme of breeding dwarf, non-lodging varieties of wheat using the Norin genes for dwarfiing and initiated the introduction of dwar, non-lodging spring wheat material from Mexico. He has been actively associated with the development of this programme, which



Dr. M. S. Swaminathan

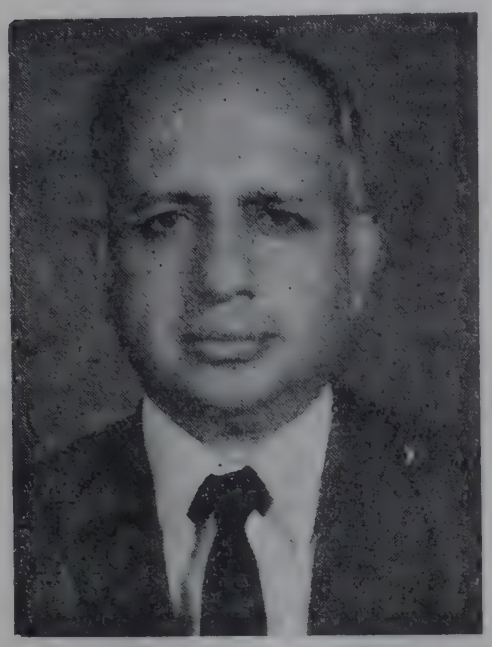
opened new vistas in wheat production. His successful accomplishment of a cross between *corchorus olitoris* and *C. capsularis* through reciprocal grafting and pollen irradiation, opened up a new era in jute breeding. The experimental manipulation of genes in a purposeful direction has been his primary research interest in recent years and this has provided the key to the initiation of the "high yielding varie ties programme".

Recently, he has brought to focus the danger of intellectual dwarfism which awaits India if the problem of protein malnutrition in the young is not faced and solved soon.

Dr Swaminathan was awarded the Shanti Swarup Bhatnagar Memorial Award in 1961.

The President of India honoured him with the award Padma Shri last year. He is a fellow of the National Institute of Science of India and the Indian Academy of Sciences.

Engineering and Metallurgy Section



Dr. K. K. Majmudar

Dr. K. K. Majmudar has been actively engaged in the field of mineral engineering for over 25 years and has organised sections for this subject at Bangalore (Indian Institute of Science), Dhanbad (Indian School of Mines) and Bombay (Bhabha Atomic Research Centre). He is at present Head of this Section at the Bhabha Atomic Research Centre, Trombay, Bombay.

Dr. Majumdar had his early education in Shillong Gauhati and Calcutta. He obtained D. Phil from Calcutta University and Diploma in Chemical Engineering from T.I.G.B. (London) in 1950. He also worked in mineral dressing laboratories at Columbia, New York, and Melbourne Universities and A.M.D.L. Adelaide. Dr. Majmudar has visited a large number of research centres and mines abroad.

During the last few years, he is working on beneficiation of atomic and strategic minerals at Trombay, and has also developed many new equipments like pneumatic floation cell, pneumatic concentrating table, pneumatic pre-concentrator, etc., which are being used in ore dressing plants. He has also guided research.

His important contributions in mineral enginering are electrical concentration, flotation, pneumatic separation and communition. He has published over 100 papers in leading journals in India and abroad. Some of his works have been referred in standard text-books. Recently, he was invited by the UNESCO to lecture on mineral dressing.

Zoology Section

Professor Srivastava's three decades at Allahabad University's Zoology department were associated with wide explorations in the field. Under his inspiration, the department attained in status and size.

Dr. M. D. L. Srivastava has had an excellent academic career. He was awarded the degree of D.Sc. of Allahbad University in 1937 and served as a teacher from

Dr. M. D. L. Srivastava

1938 to 1967 in the same university where he held the post of professor of zoology from 1955 to 1967.

Dr Srivastava was awarded the U.P. Education Minister's Gold Medal for best research papers published in the proceedings of the National Academy of Sciences of India in 1948. He worked at the Institute of Animal Genetics, Edinburgh, in Prof. Waddington's laboratory during 1950-51, under a Government of India scheme and in late Prof. Schrader's and Prof. Pollister's laboratories in Columbia University in New York, during 1954-55, as a Fulbright and Schimdt-Mundt visiting scholar.

Dr. Srivastava has published a number of research papers and a few books. A large number of research students have obtained the doctorates under him. He retired from the university service on July last.

Physics Section

Dr. Ajit Ram Verma

Dr. Ajit Ram Verma has pioneering research work to his credit in the field of solid state physics in general, and imperfections and crystal growth in particular.

Dr. Verma had his early education in Lucknow and Banaras. A brilliant student, he took his M.Sc. degree in 1942 with distinction from Allahabad University. Soon after, he joined the enthusiastic band of researchers working in various branches of solid state physics under the guidance of Prof. K. S. Krishnan, then professor and head of physics department, Allahabad University. After a couple of years,

he was awarded a British Council research work on silicon carbide using the multiple-beam interference techniques, in the laboratories of Prof. S. Tolansky of London University. He also worked under the guidance of Prof. J. D. Bernal at the Birkbeck College, London.

The subject of crystal growth was then engaging the attention of several leading physicists the world over. Theoretical considerations showed that crystals will not grow at the rate as they do at supersaturation lower than 20 per cent, if the crystals were to follow the layer by layer type of growth. Prof. F. C. Frank analysed critically the various stages of crystal growth and suggested a new mechanism whereby crystals would grow in the presence of screw dislocations even at very low super saturation. Dr Verma was the first to provide the most effective and decisive experimental evidence for the spiral mechanism of the growth of crystals. He harnessed very successfully the multiple-beam interference, X-ray diffraction and phase contrast microscopy techniques to elucidate the spiral dislocation theory of crystal growth in its major and in very many minor features. All this work has been published in reputed international journals and in the form of a book entitled "Crystal growth and imperfections."

In recognition of his research work, he was awarded the I.C.I. Research Fellowship at the Royal Holoway College, London. On his return from England in 1955, he became reader in physics at Delhi University and continued his research work in the field of crystal growth. Later, he was appointed professor and head of the department of physics, Banaras Hindu University. At Banaras, he gathered round him a very enthusiastic band of young research workers and continued his work on imperfection in crystals, polymorphism and polytypism and structure and properties of thin films. This work has thrown considerable light on the mechanism of polytypism in crystals and has been published in the form of a book entitled "Polymorphism and Polythpism in Crystals" jointly with Dr. P. Krishna. Within a few years, he had to give up his university professorship to join the National Physical Laboratory as its director.

He was invited to chair one of the sessions of the International Conference on Crystal Growth held at Boston in June 1966, and also the 7th International Congress on Crystallography and Symposium on Crystal Growth held in Moscow in July 1966.

In recognition of his outstanding work in solid state physics, Dr. Verma was elected a fellow of the National Institute of Science in 1962 and was conferred the Sir Shanti Swarup Bhatnagar Memorial Award in 1964.

Veterinary Sciences Section

Dr. Susarla Rammohan Rao

A vast proportion of agricultural produce in our fields falls prey of myriad variety of pests. Only practical research in this direction can save the plants and Dr Rao's investigations in this field have proved immensely useful. Besides, his work on parasitic diseases of livestock has saved the cattle from several fatal ailments.

Dr Rao was educated at Andhra and Banaras Universities. He obtained his D.Sc. degree in 1938 on "drosichiella quadricaudatus green", a coccid pest of many economic plants in India, under the guidance of Dr. A. B. Mishra. Dr Rao has worked on several schemes of I.C.A.R., at I.A.R.I. University of hucknow and I.V.R,I., Mukteshwar, before he came to Bombay in 1945 as parasiotologist to the civil veterinary department. His main research subject has been parasitic diseases of livestock. He teaches parasi tology at the Bombay Veterinary College.

Control

While at I.V.R.I., he was commissioned to work out "possibilities of utilising hunterellus hookeri (how)", a parasite of ticks for the biological control of the latter in India.

In 1954, he became the professor and head of the department of parasitology in which capacity he still continues. He visited the U.S.A. as a post-doctoral fellow on a Smith-Mundt fellowship, on a Fulbright travel-grant and had the opportunity of working on blood flukes of man and animals at the School of Hygiene and Public Health, Baltimore, Maryland. His main work was on cross reactions of S. mansoni antigen with other helminths such as hymenolepis, T. spiralis, and nippostrongylus and found S. mansoni antigen cross reacting with T. spiralis antibody as revealed by miracidial immoviliaction test.

He has been member of the Indian Science Congress Association for the last 30 years and has published several papers in the field of parasitology (protozoology, helminthology, entomology, and acarology).

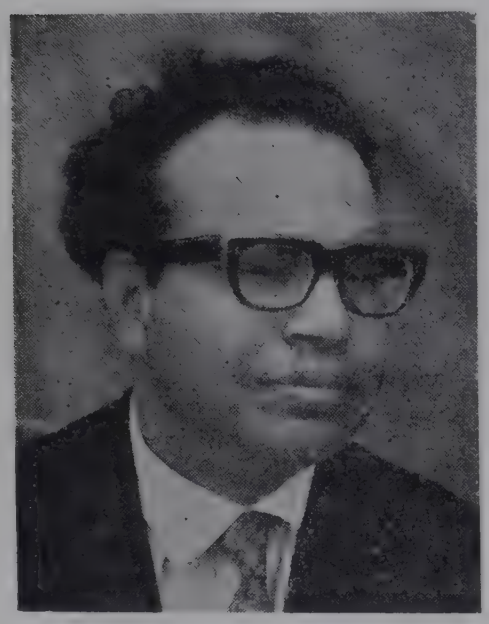
Anthropology & Archaeology Section

A keen student of social anthropology and an eminent researcher, Dr. L. P. Vidyarthi has been doing useful work for quite some time now.

Dr. L. P. Vidyarthi is the university professor and head of the department of anthro pology at Ranchi University. He has supervised several research

projects and has acted as a director of two research schemes : (1) the urban pattern of Ranchi, (2) from simpler economy to industrialisation : techno-cultural implication on changes in Hatia.

Dr Vidyarthi is now directing a research project on : "changes in leadership pattern in tribal society in India," sponsored by the Research Programmes Committee, Planning Commission. He is also co-director of the Indo-Japanese joint research project on tribal culture in India. He has been the founder-editor of Journal of Social Research for the last 10 years, and also a member of the editorial board of the Journal of Ranchi University, Sociological Bulletin (Gaziabad) and Folklore (Calcutta) for several years.



Dr. L. P. Vidyarthi

In addition to contributing to professional journals in India and abroad, Prof. Vidyarthi is author of the Sacred Complex in Hindu Gaya (1962) The Maler : a study of nature-man-spirit complex in a tribe of Bihar (1963), Cultural Conteures of Tribal Bihar (1964) Ghaghra : a villge of Chetanagpur (1965), Indian Cities (Hindi) Anthropology (1963) in Hindi with K. S. Mathur and I.P. Singh (1962). The Cultural Configuration of Ranchi : A study of a pre-industrial city (1967) and several other books and learned papers.

Mathematics Section

Dr. J. N. Kapur

Modest and unassuming by nature, Dr. Kapur has immense love for real original work in mathematics.

Dr. J. N. Kapur, professor and head of the department of mathematics at the Indian Institute of Technology, Kanpur, had a uniformly brilliant academic career. He possesses a doctorate in mathematics from Delhi University, is a fellow of the Indian Academy of Sciences, of the National Academy of Sciences. and of the Institute of Mathematics and its Applications of the U.K. He has published a large number of research papers

Most of these research papers have been published in India and abroad.

Prof. Kapur is the author or co-author of mathematical statistics, vector calculus, text-book of dynamics, essays on mathematics education, some aspects of mathematics education in India, some aspects of school mathematics, suggested experiments in school mathematics the spirit of mathematics, nature of applied mathematics, new mathematics for school teachers and a course of logic, mathematical models in social sciences. He is the chief editor of school mathematics text books, director of the Kanpur Mathematics Study Group.

Psychology Section

Promising research work in verbal learning, now being done at Poona University under the guidance of Prof. V. K. Kothurkar when complete will have great significance.

Prof. V. K. Kothurkar, professor and head of the department of experimental psychology, University of Poona, has a distinguished academic record. He studied at Bombay and Cambridge Universities.

Since 1950, Prof. Kothurkar is heading Poona University's department of experimental psychology which he set up from a scratch. This department is considered to be one of the best in India and Far Middle East. At Poona University, he has established a centre of basic research in verbal learning and verbal behaviour and succeeded in carrying out steady and sustained work in the area of memory processes—the problems of memory storage and retrieval from it.

Prof. V. K. Kothurkar

An author of half-a-dozen books and survey reports, Prof. Kothurkar has published over 50 research papers in journals in India and abroad.

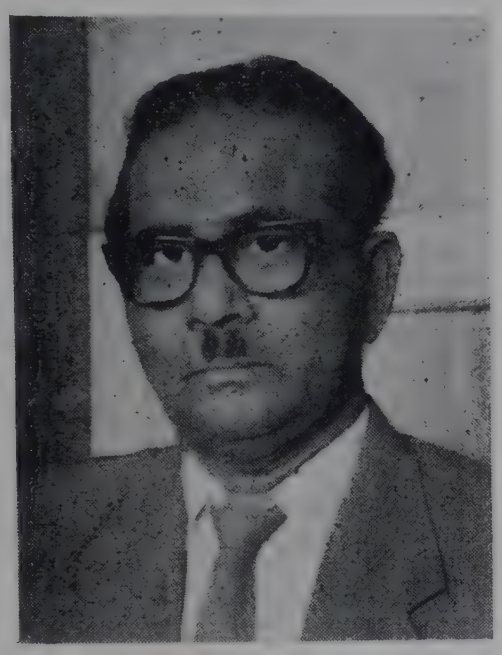
He has also been working in the general area of group prejudice, Hindu-Harijan relations, attitudes towards Muslims and minority group psychology. He

has constructed a psychological group of general mental ability.

Botany Section

Having been associated with great men like Tagore is itself a big qualification. Prof. Nandi who has worked under the poet laureate, emulates the great teacher's way of patient, persistent work. This has paid dividends and he has risen to a high position by hard work and diligence. His research in botany has explored new horizons.

Prof. Nandi who had his early training in research under Dr. P. N. Ghatak at Calcutta University and Prof. S. R. Bose has served Visva-Bharati University, Scottish Church College, Calcutta, and is now professor and head of the microbiology department, Bose Institute, Calcutta.



Prof. P. N. Nandi

Prof. Nandi possesses a doctorate from the Imperial College of Science and Technology, London. Since 1948, he has worked on several projects and has contributed numerous original papers in journals in India and abroad.

Physiology Section

Useful investigations in drugs and pharmaceuticals in India has been compratively scarce. But with Dr. M. L. Chatterjee's work it has certainly reached a respectable stage where others can derive inspiration. His work in field has yielded rich results.

Dr. Madhab Lal Chatterjee had his early education in medicine

Dr. M. L. Chatterjee

in Calcutta and has worked through several laboratories. He obtained D. Phil. from Oxford University in 1954.

Dr. Chatterjee is now functioning as professor of pharmacology, of the School of Tropical Medicine, Calcutta, and is a visiting physician at Carmichael Hospital for tropical diseases since 1955 and the deputy director of the school since 1958.

He served as a member of the Drugs Technical Advisory Board, Government of India, from 1959 to 1963, and the Drug Enquiry Commission, Government of West Bengal (1966). He is a member of the Development Council for Drugs and Pharmaceuticals, under the Ministry of Petroleum and Chemicals, Government of India since 1962. He was recently appointed by the Government of India as a director of the Hindusthan Antibiotics, Pimpri. He also served as the secretary and later as vice-president of the Calcutta branch of the Scientific Workers Association (1947-51).

Geology and Geography Section

That field work pays and has vast possibilities for a keen researcher has been proved by Mr. Kundan Lal Bhola, a prominent geologist and keen explorer. Mr. Bhola has received his education at Lahore and Dhanbad.

After receiving training under Dr. D. N. Wadia and Dr. J. B. Auden of the Geological Survey of India, he served as geologist-cum-mining engineer in a leading mining concern and later as state geologist to the former Jodhpur state and conducted mineral surveys, prospecting exploration and mining of economic minerals. He also worked with the Burmah Oil Company and conducted detailed stratigraphical and structural work in several areas in Assam and surveys for petroleum in a number of important areas most of which now are in Pakistan. He led the geological party which was responsible for revision of tertiary correlation of North-West India, (now in West Pakistan).

Mr. K. L. Bhola

With the Atomic Energy Commission since 1949, Mr. Bhola has served in several capacities. He has lately been engaged in exploration of the entire Singh bhum Thrust belt for uranium involving extensive drilling and exploratory mining of Bhatin and Narwapahar, the latter being the largest known uranium deposit in India.

Mr Bhola is the member of many learned societies and has published over 20 papers in leading scientific journals.

Periodicals & Some Recent Publications of the Council of Scientific & Industrial Research

Journal of Scientific & Industrial Research

A monthly general science periodical carrying critical review articles, reports on symposia and conferences, etc. Annual subscription : Rs. 30·00 for institutions, Rs. 22·50 for individuals.

Research Periodicals

INDIAN JOURNAL OF CHEMISTRY (MONTHLY)

INDIAN JOURNAL OF PURE & APPLIED PHYSICS (MONTHLY)

INDIAN JOURNAL OF TECHNOLOGY (MONTHLY)

INDIAN JOURNAL OF EXPERIMENTAL BIOLOGY (QUARTERLY)

INDIAN JOURNAL OF BIOCHEMISTRY (QUARTERLY)

Serve as media for original researchd communications in the respective subject disciplines, and are treated as 'core' journals from India by international indexing and abstracting periodicals and agencies. Annual subscription for individual periodicals : Rs. 30.00 for institutions and Rs. 22·50 for individuals.

Indian Science Abstracts

A monthly abstracting periodical published by the Indian National Scientific Documentation Centre (INSDOC) reporting work published by scientists in India, and also communications published by Indian scientists in foreign periodicals. Nearly 12,000 documents are noticed every year. Annual subscription : Rs. 50·00.

Research & Industry

A quarterly periodical presenting nascent information of applied nature to industry. Annual subscription : Rs. 12·00.

Science Reporter

India's first popular science periodical carrying articles on topics of current scientific and technological interest contributed by specialists. Annual subscription : Rs. 5.00.

Vigyan Pragati

A monthly popular science periodical in Hindi carrying popular write-ups on topics of current interest. Annual subscription : Rs. 5·00.

Indian Educational Material An Annotated Quarterly Bibliography

A quarterly abstracting periodical covering Indian documents on all aspects of education, published by INSDOC. Nearly 1200 documents are noticed every year. Annual subscription : Rs 15·00.

The Wealth of India: A Dictionary of Indian Raw Materials and Industrial Products

An encyclopaedic compendium of information on India's raw material resources and industrial products, issued in two series : (*i*) Raw Materials and (*ii*) Industrial Products. Vol. VII in Raw Materials series (N-Pe) covers 294 entries on plant species, 4 on animals and animal products, and 3 on minerals. Price: Rs. 30·00.

Part VI in Industrial Products series (L-M) covers 28 entries. Price : Rs. 28·00.

The Flora of Delhi (by J. K. Maheshwari)

The monograph is the first exhaustive flora of Delhi, covering 942 species of indigenous, naturalized and cultivated plants, under 549 genera belonging to 120 families. Price : Rs. 28·00. Illustrations to the Flora of Delhi (under separate cover) Price : Rs. 28·00.

Indian Fossil Pteridophyta (by K. R. Surange)

Fourth in Botanical Monographs series, the publication presents under one cover all available information on the morphology and taxonomy of the known Indian fossil pteridophytes. Price Rs. 23·00.

CNS Drugs

Contains papers presented at an international symposium held (24-30 January 1966) at the Regional Research Laboratory, Hyderabad, dealing with chemistry and pharmacology of drugs acting on the Central Nervous System (CNS), their structure-activity relationships, theories on mechanism of action and development of tolerance. Price : Rs. 33·00.

Drug Addiction, with Special Reference to India

(by R. N. Chopra & I. C. Chopra)

Deals with various aspects of the addiction producing drugs, their chemistry, psychiatric and chemical aspects, treatment etc. Price : Rs. 12·00.

Work Done in India on Viral and Rickettsial Infections—A Bibliography

A comprehensive bibliography published by Insdoc covering work during the period 1900 to 1965 with a valuable introduction by Dr. T. Ramachandra Rao, Director, Virus Research Centre, Poona. It contains 3,267 entries on viral and rickettsial infections, as well as on bacteriophages. Price : Rs. 50·00.

Directory of Indian Scientific Periodicals, 1967.

The Directory published by Insdoc contains a total of 994 entries listing periodicals current to the end of 1967, including 150 annual reports of scientific and technical institutions. Nearly 100 Indian language periodicals are listed. Price : Rs. 10·00.

Master's Degrees Awarded in India in Science Subjects : 1921-65

Presents authoritative data regarding the annual outturn of post-graduate scientists in different subjects from various universities and other institutions of equivalent status. Published by the Directorate of Scientific & Technical Personnel, CSIR Price : Rs. 10·00.

SALES & DISTRIBUTION SECTION

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Nehru's Role in Scientific Growth of India

By B. R. Seth
Vice-Chancellor, Dibrugarh University

FREEDOM is the essence of all sciences. Without it, no advance can be made in any sphere of human activity. In Upanishidic lore, the disciple asks the Guru about the origin, continued existence and the disintegration of our world. And the Guru replies that in freedom it is born, in freedom it lives and unto freedom it goes.

No rigid frame-work, therefore, can hold true for all times. No political doctrines or man-made laws are sacrosanct. So Nehru believed that an 'ism' which may hold good today may not do so tomorrow. This is true of all scientific theories. Newton propounded the Corpuscular Theory of Light : it was replaced by the Wave Theory and we are now back again to theories of elementary particles. It is known that the same phenomenon may be explained by different theories under different conditions. Nehru appreciated this and applied it to human beings in the large. That is why at one time one finds him dancing with the hill people in a Naga robe, enjoying sumptuous dinners in the Middle East, or very sophisticated conferences in London and Washington. In fact, the strength of the Congress Party during his time was entirely due to the manner in which new concepts, either of the leftists or the rightists could be assimilated in the party programme

Some seem to think that his secularism amounted to atheism. Nothing can be far from truth. He was misunderstood. He respected the teachings of all religions, but seldom cared for the rituals attached to them, if a dip in the Ganges or a visit to Mecca or Jerusalem can wash away all our sins, the world would be a better place to live in. But interestingly enough, it is reported that he took a copy of the Bhagawad Gita with an English translation to be presented to President Kennedy when he met him for the first time in Washington. That shows the regard in which he had held the eternal truths in the Song Divine and to which famous atomic physicists like Oppenheimer could not help feeling attracted.

In his day-to-day work, Nehru did not want to dictate, but wanted people to work for themselves. No attitude could be more scientific than the manner in which he refused to name his successor. Sometime he did loose his temper, but that was like the phenomenon of resonance when the vibrating group with which he had to deal with became so static that it could not complete even one oscillation. There are instances when, in a big meeting, he simply jumped into the noisy and violent crowd and restored order. This, almost child-like behaviour, is common to many scientists.

Scientific Attitude

In his objective achievements to propagate science, the visible results of a scientific temper are too many to be given. The whole chain of national laboratories numbering over 30, employing 6,000 scientific and technical personnel and turning out more than 600 research papers in a year is a living monument to his memory. They provided a forum for young workers, and their recurring expenses sometimes amounted to as much as Rs. 6 crores.

His lavish attention to scientific projects was criticised by some of his friends. But he believed that the only way in which the human spirit in India would be retrieved from the mud and filth of centuries was to free if from the drudging influence of fighting incessantly for the satisfaction of physical wants. Rapid industrialization was, therefore, necessary. In Dr. Bhatnagar, he found out a collaborator who could carry out his inspirations. It is a great credit to him that a distinguished scientist gave his time, heart and soul to the building up of a chain of laboratories. Nobody could have achieved so much in such a short spate of time. This almost resulted in the atomic age developing side by side with the cow-dung age, But unless we skip over centuries of redundant scientific work, we cannot make any progress. The Atomic Energy Commission proved its worth and we are now supplying heavy water even to western countries. Dr. Bhabha grew up so much in stature and position due to his (Nehru's) generous support and encouragement that we can now put atomic thermal plant in our country ourselves. His interest in scientist--both young and old—was perpetual. Every year he set aside all work to preside over the Annual Session of the Indian Science Congress and to welcome distinguished scientists from abroad, who came to participate in it. He knew he could contribute very little to scientific research in the laboratory, but he also felt that his presence on such occasion, would help to strengthen the prestige of science in India and abroad.

Individual Help

The individual and collective help given to scientists from time to time is not widely known. But those who came in his contact got not only the means to do a project, but also the inspiration to sustain their efforts.

At no time Nehru hestitated to make fun of superstitions, out-moded traditions and unscientific behaviour. It did not matter whether he was in a scientific gathering or he was addressing a public meeting. While laying the foundation-stone of the Birbal Sahni International Institute of Paleabotany in Lucknow during the session of the Science Congress, he remarked : "I do not know why our distinguished botanist, Dr. B. Sahni, goes to the Himalayas in search of fossils; he can find plenty sitting now in the pandal."He was having a dig at some of the distinguished

cabinet ministers who were relaxing with their eyes closed.

Likewise, in 1948 when he was laying the foundation-stone of the building of the National Institute of Sciences at Mathura Road, New Delhi, he said : "New Delhi is the last place where a scientist should work. He should not live in the noise and turmoil of politics. He should be protected from the furyof passions, hatred and jealousy which permeate a large metropolis. New Delhi was the last place in which National Institute of Sciences of India should have been located". It appears that some had not carried out what he desired. He was in a bad mood. He did not take the tea arranged for the function. After saying these harsh words, he abruptly left. The organizers of the function ran after him almost in dismay. What he said years ago is even truer today. The confusion that exists in our universities and institutes is due to our failure in inculcating and adopting a spirit of inquiry and research. The scholastic standards have gone down and violence, strikes, gheraos have erupted.

Full Freedom

Even in the Rajya Sabha and Lok Sabha, Nehru did not hesitate to pull up distinguished scientists when any of them, impelled by party affiliations or other personal reasons, adopted an unscientific behaviour. His concept of science involved the fullest freedom from all constraints. Much has been written on how he could reconcile himself to the cottage industries concepts of Gandhiji during his life-time. In fact on national occasions, he did some spinning himself. But that is where lies his greatness. He knew that a nation could not go to the higher rungs of scientific achievement overnight. He had to synthesise the almost primitive practices of the farmer with the advanced agricultural techniques. But he also wanted to awake people from sleepy customs and habits and so he gave the shock treatment to many by creating projects like Bhakra Nangal Dam, steel and fertilizer plants and other big projects.

Modern India is the creation of Nehru. That we have become self-sufficient in a large number of industrial products is the result of his scientific vision. That we can export machinery, scientific goods and industrial know-how not only to Middle East and South-East Asia, but also to western countries, is a significant testimony to his scientific temper. It is to be hoped that petty party considerations and make-shift solutions of current problems would not slow down our progress. For nothing would hurt his spirit more than to see that this great country, which fully reciprocated his love, had bogged down in the mire of party rivalries, and political shibboleths.

Like a true scientist and research worker, his integrity was above suspicion. As Mahatmaji remarked in 1922 when he was recommending Nehru for the Presidentship of the Congress : "He is pure as crystal; he is truthful beyond suspicion. He is a knight san peur et sans reproache". Science could not have got a better votary to work for it.

Science in Nehru

Jawaharlal Nehru has become a part of the world history. Coming generations will talk and write about him. So much has been written about him that it may not be possible for the present generation to appreciate the impact he had on current affairs both at home and abroad. "The Science in Nehru" left an indelible imprint on all what he thought and did. Many say he was a westerner who put on an eastern garb to impress his countrymen and that he did not belong to the people; others testify that he was steeped in Indian thought and traditions, but that he did not want the cobwebs of traditionalism to spoil his work. In a sense, both views are correct. In the first few years of his premiership, he did not mind adopting western formalism when he went abroad; later he did not care to.

The science in Nehru manifested itself in all facets of its personality. Whatever he touched had to be treated objecitvely subject to the available data. Like all scientists, he was also sometimes misled, but he admitted his mistakes the moment he found them. Gandhiji brought a sense of ethics and fair-play into political thought and behaviour through the principles of truth and non-violence. Nobody believed that they could be practised on a mass scale. But he showed that a nation could get its freedom through them. It was left to Nehru to show their efficacy through the five axioms of Panch Sheel and get a large number of nations agree to them. It is true that some countries like China have betrayed them, but that does not show that they are incorrect.

Non-Alignment

His doctrine of non-alignment and neutrality were not taken seriously at the start. Even some of the Indian newspapers poked fun at them, but when their application was initiated at the time of the visit of President Tito of Yugoslavia, the whole world took notice of them. Today all nations, big and small, including the USA and the USSR, have nothing to fall back upon in settling international disputes than the principles of Panch Sheel. The future political scientists will have nothing but admiration for the man who enunciated them. Small nations on the continent, like their counter-parts in South-East Asia, can only be saved from the devouring influence if dictatorialism in these principles are adhered to.

The spirit of science is dynamism; so he was never static. In body, in mind, in spirit he was all motion, bubbling with energy and the joy of fulfilment. His contempt of astrology, auspicious occasions, religious rituals, all emanated from the underlying spirit of enquiry. If planets

(*Continued on page 20*)

SCIENCE IN BHU

(*Continued from page 4*)

The study of mycology is being persued by Dr. R. Y. Roy. His special interests are ecology of soil fungi, fungi associated with roots of fodder grasses, leguminous crops, fibre yielding plants, medicinal plants, etc. This section has been strengthened by the appointment of Dr. R. S. Dwivedi. Seven students have already been awarded the Ph.D. degree. There are nearly a dozen scholars in the department working in this field.

Dr. R. N. Singh has lately undertaken studies of genetics of blue-green algae including blue-green algae viruses. More than a dozen students have obtained the Ph.D. degree under his guidance and a large research project on the physiology and biochemistry of nitrogen fixation by blue-green algae has been started.

Cytogenetics

Others interested in the cytogenetics and cytotaxomony of algae are Y.S.R.K. Sarma, C. S. P. Rao, and Y. B. K. Chowdhary. Biochemical aspects of blue-green algae, including nitrogen fixation, phosphorus, metabolism and cellular differentiation are being studied by E. R. S. Talapsayi. Ecological aspects of the marine algae of the West Coast were investigated by Dr. J. N. Misra, while their cytological aspects were studied by Dr. C. S. P. Rao.

Bryological research in the university has started with the arrival of Dr. R. N. Rao who is studying the effects of environmental pollution by industrialisation with special reference to bryophytes and lichens.

Researches in plant physiology which languished with the departure of Prof. R. S. Inamdar have been revived by Dr. K. L. Mukherjee and his students. Their main interest centres around host parasite relationships in angiospermic parasites.

Chemistry : Chemistry department has had such illustrious teachers as the late Dr. S. S. Bhatnagar and Dr. S. S. Joshi. As a result of intensive work of Prof. Joshi in discharge phenomenon through gases, a new light-effect known as "Joshi Effect" was discovered.

Organic chemistry developed under the guidance and supervision of Prof. P. S. Verma (1921-52). His contributions in the field of halogenation of organic compounds are widely known; He is also the author of several books on chemistry both in Hindi and English.

After a long service of 30 years, Dr. S. S. Joshi retired in 1959 and Prof. G. B. Singh, a distinguished student of Professor R. B. Woodward, N. L., joined as the head of the department. Research facilities are available in most disciplines of chemistry. The department has now expanded to the strength of 42 researchers.

Special Subjects

Apart from undertaking under-graduate teaching for more than a thousand students, the department has about 85 students at M.Sc., and more than 50 students at research level. The special subjects of M.Sc. are organic chemistry including biochemistry, inorganic chemistry, physical chemistry including nuclear and radio-chemistry, and analytical chemistry.

Geology, Geophysics and Geography : The department of geology was transferred from the Engineering College to the Science College in 1935. Profs. K. K. Mathur, Raj Nath and V. S. Dubey organised teaching and research activities in various fields of geology. Prof. S. K. Agrawal is the present head of the department. This is well equipped for research in geo-chemistry, petrology, economic geology, stratigraphy, palaentology, Himalayan geology and tectonics, and ground water studies.

The teaching of geography was initiated in geology department by Prof. S. K. Chibber in 1945. The department of geography is now an active centre of studies of urban geography under the leadership of Prof. R. L. Singh. The headquarter of the Indian Geographical Society is also located here.

Physics and Spectrosocopy : From 1930 to 1950, the physics department was engaged in research on posotive rays, X-rays, wireless, cosmic rays and spectroscopy. Prof. S. R. Khastigir and A. R. Verma started new lines of research and as a result of their efforts, research facilities in nuclear physics, X-ray crystallography and solid state physics were built up. Recently an electron microscope has been installed in the laboratory. The electronics and radio physics laboratory provides research facilities in very low frequency studies, transistor electronics and ionosphere studies.

Spectroscopy department has been built through the work of Prof. R. L. Asundi and Prof. Nand Lal Singh. Currently research work on the high resolution of diatomic and multiatomic molecules is in progress.

Zoology : Zoology department has been engaged in research work on entomology, ichthyology and avian biology until 1960. Now Prof. S. P. Ray-Choudhuri is concentrating on cytogenetics, endorcrinology, physiology and biochemistry, ichthyology, herpetology and reproduction biology. Dr. Kanungo is working on animal physiology, especially the physiology of aging. Dr. Thapliyal is busy with studies on the endocrimology of birds.

Agriculture : Agricultural studies in the university got a good start during 1930 when an Institute of Plant Physiology was set up with Dr. Bholanath Singh as its head. Physiological studies on sugar-cane and paddy were intensively taken up during the 1940. Later, several other courses were included and the small institute has developed into a College of Agriculture with post-graduate courses in agronomy, plant physiology, agricultural chemistry, animal husbandry, plant breeding and genetics, and agricultural economics. There are nearly 50 teachers in the college and nearly the same number of research scholars.

Medical Sciences : The College of Ayurveda was reorganised into the College of Medical Sciences in 1960. It has at present 15 departments and a hospital with over 500 beds. The departments of Ayurveda, anatomy biochemistry, biophysics, forensic medicine, medicine, microbiology, obstetrics and gynacology, opthalmology, paediatrics, pharmacology, physiology, preventive and social medicine, and surgery are well equipped for teaching and research. A special feature is an active post-graduate Institute of Indian Medicine in which inevstigations are being carried in various aspects of Ayurvedic medicines and Indian medicinal plants. Surgery department of this college comprises three surgical units and one unit each of orthopaedics, anaesthesiology, otorhinolaryngology, dentistry, neurousrgery, plastic surgery, thoracic surgery, paediatric surgery and urology. A special burn unit has been established recently, and a heart-hung machine and an artificial kidney unit have been procured.

All the 15 departments of the college impart teaching up to the M.B.B.S. degree and provide facilities for research work for M.D. and Ph.D. degrees.

Faculty of Engineering : This includes the departments of electrical, mechnical and civil engineering, mining and metallurgy.

Electrical engineering department is one of the oldest in the country. Course in applied electronics, power engineering and electrical machine design are being given up to the M.Sc. standard. Radio communication section has been quite active in research and 18 research scholars have already obtained Ph.D. The department assists industries in the neighbourhood by giving them technical advice and facilities for testing.

Mechanical engineering department is also a pioneer department. Courses dealing with machine design and heat power are given to B.Sc. and M.Sc. (Engg.) students.

Civil engineering department is specialising on hydraulics and fundamental analysis of rock mechanics.

Pilot Plant

Mining department has built an experimental mine for practical training to the students. The department has 16 well equipped sections; rock mechanics experimental stress analysis, mining machinery, workshop technology, instrumentation, fabrication and documentation. Dr. A. N. Tripathi has developed a device to forecast the occurrence of earthquakes with considerable accu racy.

Metallurgy department is well equipped for teaching and research work leading to M.Sc. and Ph.D. degrees. The department possesses pilot plants and equipment for research into the metallic state. The post-graduate programme provides two areas of specialisation : (1) ferrous metallurgy and (2) physical metallurgy.

Faculty of Technology : This includes the departments of chemical engineering, silicate technology and pharmaceutics.

Chemical engineering department attracts the maximum number of students. It provides facilities for teaching and research in workshop technology and fabrication of equipment.

Silicate technology department provides teaching facilities up to M.Sc. course. Research on the interaction of some in organic oxides and spinels in solid state is in progress.

Pharmaceutics department prepares students up to the M.Sc. (Pharm.) standard. Studies on pharmacognestical, phytochemical and pharmacological aspects of indigenous drugs and the chemistry of certain organic compounds are in progress. So far ten research scholars have been awarded Ph. D. degree in this subject.

Thus within a span of about 50 years the university has made a steady progress in almost every branch of science and technology and it can look forward hopefully towards making still greater contributions to the development of science, agri culture, medical sciences and industry in the coming years.

CONTRIBUTIONS !

Articles on different aspects of higher education in India and abroad and on students' problems, write-ups on universities and campus news are invited for publication in the University News. These may be sent to the Publication Officer, Inter-University Board of India & Ceylon, Rouse Avenue, New Delhi-1.

NEHRU AND SCIENCE

(*Contd. from page 18*)

influenced our lives, (as they do), let us change their course like those of rivers. He believed rightly that all forces in nature could be controlled and harnessed for the benefit of humanity.

Natural Forces

The Indians, the Greeks, the Romans—all created Gods of natural forces which they could not conquer or subdue. The God of Rain, the God of Seas, and a hundred other ones are too well-known. The superstitions about the moon have been exploded. There is no reason to believe that man cannot be the master of his own destiny. This inspiration was responsible for his great contribution to the rapid growth of science and technology in India. Hardly a day passed, when a new project was not started. At some place in some remote corner of the country, the foundation-stone of a factory, a plant or a dam was being laid. Laughingly, he used to say that not all the stones laid by him will grow into big buildings. But that does not mean that we are not moving forward. In scientific research many concepts present themselves to a worker. He cannot take all of them at the same time. The more important ones are taken first.

Classified Advertisements

UNIVERSITY OF POONA

Applications are invited for the following teaching posts in the various Departments of the University :—

1. Department of English; 1 Reader. 2. Department of Modern European Languages, 1 Reader in German, 1 Reader in French 1 Lecturer in Russian. 3. Department of Ancient Indian Culture and Archaeology; 2 Readers. 4. Department of Philosophy; 2 Lecturers. 5. Department of History; 1 Professor, 1 Reader, 1 Lecturer.

6. Department of Politics and Public Administration; 1 Professor. 7. Department of Sociology; 1 Professor, 1 Lecturer. 8. Department of Experimental Psychology; 1 Lecturer. 9. Department of Chemistry; 3 Readers, 2 Lecturers. 10. Department of Physics; 1 Professor, 1 Reader, 1 Lecturer. 11. Department of Mathematics, and Statistics; 1 Professor in Statistics 1 Reader in Statistics, 1 Readder in Mathematics, 2 Lectures in Mathematics. 12. Department of Geology; 1 Professor, 1 Reader, 2 Lecturers.

13. Department of Botany; 2 Readers 1 Lecturer 14. Department of Zoology. 2 Readers, 2 Lecturers. 15 Department of Geography;1 Reader, 1 Lecturer, 16. Department of Anthropology; 2 Readers. 17. Department of Law; 1 Reader, 1 Lecturer.

Detailed information regarding qualifications, pay scale etc. will be supplied along with the prescribed application form on receipt of a self-addressed envelope (23 cm x 10 cm) bearing postal stamps worth Re. 0.45 Paise to cover the postage. Applications should reach the University Office not later than 31*st January* 1968.

Ganeshkhind, **W. H. Golay**
Poona-7.
December 12, 1967 **Registrar**

INSTITUTE OF POST-GRADUATE (EVENING STUDIES)
University of Delhi Delhi-7
Dated 18-12-67

Principal, Institute of Post-Graduate (Evening) Studies, University of Delhi, Delhi-7 invites applications by 20th January, 1968 on the prescribed form (alongwith seven typed copies on plain paper) available from the Office of the Institute by sending a self-addressed stamped envelope (9 x 4) with stamps worth 75 paise for the following posts. Candidates already in service should apply through proper chanel.

Designation

(*i*) Reader in Mathematics; One. (*ii*) Lecturer in Mathematics; Two. (*iii*) Lecturer in Hindi; One. (*iv*) Lecturer in History; One (temporary but likely to continue). (*v*) Lecturer in Economics or Lecturer in Commerce for the Department of Commerce.

Scale of Pay for :
Reader : Rs. 700-50-1250;
Lecturer : Rs. 400-40-800-50-950.

Dearness, City Compensatory and House Rent Allowance admissible according to the University rules in force from time to time.

General Qualifcations :

(*a*) **For Readership**

"Good academic record with first or high second class M.A./M.Sc. Degree in Mathematics with a Doctor's Degree or equivalent published work.

Independent published work (in addition to the published work referred to above) with at least five years' teaching experience in Honours/Post-graduate classes essential."

(*b*) **For Lectureship :**

"Good academic record with first or high second class M.A./M. Sc., Degree in the subject concerned.

Published work/advanced studies or experience of teaching degree classes for not less than two years.

Special Qualifications :
For Readership in Mathematics : Modern Algebra, Topology.
For Lectureship :
Economics : Statistics or Economic Theory.
Hindi : A Scholar with specialized knowledge of Philogoy with reference to the development of Hindi Language will be preferred.
History : Preferably European History or Modern Indian History.
Commerce : Capable of taking Applied Economics and Taxation.

Selected candidates will be required to produce the documents in original relating to their qualifications and experience etc. before the offer is made to them.

Principal

N.B. : Relaxation of any of the qualifications may be made in exceptional cases. Canvassing in any form by or on behalf of the candidate will disqualify.

DECCAN COLLEGE POONA

APPLICATIONS (six copies) are invited for a Junior Research Fellowship in Linguistics of Rs. 300/- p.m. at the Centre of Advanced Study in Linguistics. Candidate should possess an M.A. degree in Linguistics or M.A. degree in Sanskrit and two-year Post-graduate Diploma in Linguistics. Candidate having published work of recognized merit and experience of field work will be preferred.

The Fellowship is ordinarily tenable for two years but may be extended for third year.

Forms of application can be had from the undersigned on payment of Rs. 1·50 per set. Last date for receipt of applications is 15*th January* 1968.

Registrar
5.12.67. **Deccan College, Poona-6.**

SHIVAJI UNIVERSITY, KOLHAPUR
Advertisement.

Applications are invited for the posts of Deputy Registrar and Assistant Registrar :—

(1) **Deputy Registrar** : in the scale of Rs. 700-40-1100 plus D.A. Rs. 85/- and H. R. A. Rs. 75/- p.m.
Qualifications and Experience :— Master s Degree and through knowledge of University working and adequate experience in a responsible position in a University or a College.

(2) **Assistant Registrar** :—in the scale of Rs. 350-15-500-E8-25-550-30-670 plus D.A. and H.R.A. at State Government rates.
Qualifications and Experience :— Preferably Master's Degree with good knowledge of University working and experience in a responsible post. One who is well versed in accountancy and auditing would be preferred.

Applications stating particulars regarding birth-date, qualifications, experience, present employment etc., should reach the Registrar, Shivaji University, Vidyanagar, Kolhapur-4, on or before 20*th January*, 1968.

U. ITHAPE
Registrar

MARATHWADA UNIVERSITY

Applications are invited for the posts of three lecturers in Botany Department of the Marathwada University. Out of these three posts, the post mentioned under the Head "Special" at Sr. No. 3 below will be filled up immediately and the remaining two posts will be filled up after approval of the University Grants Commission to the same is received.

The scale of pay for the post of Lecturer is of Rs. 400-30-640-40-800 and carries with it the benefits of the house rent and Provident Fund in accordance with the rules of the University. The scale of pay is as prescribed by the University Grants Commission and carries *no* allowance of any kind with it.

A higher starting salary in the grade may be offered to a person with high academic qualifications and teaching experience. The appointment will be on probation for a period of two years in the first instance.

Qualifications

(*a*) **General** :—
1. B.Sc. and M.Sc. of a recognised University at least in Second Class.
2. Research experience of at least two years and/or adequate teaching experience of Post-Graduate classes.

(*b*) **Special** :—
Post 1. Specialisation in Cytogenetics and Plant Breeding at M.Sc. with a Ph.D. in Cytogenetics and/or with Research Publications of recognised merit.
Post 2. Specialisation in Plant Pathology with a Ph.D. in Physiology of Fungi and/or with Research Publications of recognised merit.
Post 3. Specialisation in Angiosperms or **Cryptogam** with a Ph.D. and/or with Research Publications of recognised merit.

Qualifications may be relaxed at the discretion of the University authorities in the case of the candidates considered otherwise well qualified, on the recommendation of the Selection Committee. The candidates applying for the posts should ordinarily be below the age of 35 years as on 6*th February* 1968. The age limit may be relaxed in the case of deserving candidates.

Seven copies of applications should be submitted in the prescribed form, which can be obtained from the

Office of the undersigned upon request *accompanied by a self addressed envelope* (23 *C.M.* x 10 *C.M.*) *bearing postage stamps of the value of* 25 *paise, so as to reach the under signed on or before* 6*th February* 1968.

Canvassing direct or indirect will be a disqualification.

Marathwada University,
University Campus
Aurangabad. *Registrar.*
December 25, 1967.

University of Roorkee, Roorkee

Admission Notice

A Competitive Entrance Examination for admission to the following courses for the Session 1968-69 will be held on the dates given against each. *Last Date* for the receipt of completed Application Forms is *January* 31, 1968 and with late fee *March* 1, 1968.

1. (*a*) FIRST YEAR OF FOUR-YEAR BACHELOR OF ENGINEERING DEGREE COURSES IN CIVIL/ELECTRICAL/MECHANICAL/ELETRONICS & COMMUNICATION/CHEMICAL/METALLURGY(*May* 9, 10 & 11, 1968)
Minimum Qualifications : Intermediate Science or equivalent with Mathematics, Physics & Chemistry or Geology.

(*b*) **First Year of Five Year Bachelor of Architecture Degree Course** (*May* 9, 10 & 11, 1968)
Minimum Qualifications : Intermediate Science or equivalent with Mathematics, Physics, & Chemistry or Geology. OR Inter Arts with Mathematics provided High School or equivalent Examination was passed with Physics & Chemistry.

2. **Second Year of Four Year B.E. (Civil) Degree Course.**
(*May* 6, 7 & 8 1968)
Minimum Qualifications : B.Sc. with Physics, Chemistry & Mathematics.

Note :— (*i*) **Women** candidates are eligible for admission to any of the courses freely, if successful in open competition subject to certain reservations detailed in the Circular.

(*ii*) All question papers for the Examination will be set in English and the Candidates must also answer them in English.

Age on First October-1968; for (1) 17 to 21 Years; for (2) 18 to 22 Years; Upper age limit relaxable upto three years for Scheduled Castes and Scheduled Tribes/Denotified Tribes candidates only.

Centres for Examinations :

(*a*) **For First Year Examination** :— Agra, Allahabad, Ahmedabad, Bareilly, Bulandshahr, Calcutta, Dehradun, Delhi, Gorakhpur, Gauhati, Ghaziabad, Hyderabad, Jaipur, Kanpur, Lucknow, Ludhiana, Meerut, Muzaffarnagar, Nainital, Nagpur, Roorke & Saharanpur.

(*b*) **For Second Year Examination** :— Agra, Allahabad, Bareilly, Calcutta, Delhi, Hyderabad, Lucknow, Meerut, Roorkee — Saharanpur.

Separate Application Forms are to be submitted for **Each** Entrance Examination for admission to (1) First Year of B.E. & B. Architecture Courses (2) Second Year of B.E. (Civil) Course.

Application Forms and Circular may be obtained **Free** from the Assistant Registrar (Exams.) on a written request mentioning the name of course of admission, which must be accompanied by a self addressed envelope of 9″x4″ size with unstamped postage stamps of 35 Paise affixed thereto for *each* form. Money Order or Postal Order **Not** acceptable.

A number of Merit Scholarships of Rs. 75/- per month are awarded by the University and no tuition fee is charged from them. In addition **One** Banke Lal Subarwal refundable merit scholarship of Rs. 75/- per month (for a student of Bengal Domicile) and *two* West Bengal Government non-refundable scholarships of Rs. 75/- each per month (for Bengali students of Bengal Domicile) are also available. Full details of other scholarships are given in the Circular.

Last date for receipt of postal requests for Circular and Application Forms is 24,2.1968

V. N. KAK
Registrar

TATA INSTITUTE OF SOCIAL SCIENCES

Chembur, Bombay 71 AS

Applications in the prescribed from are invited for the following posts:

1. **Professor of Social Work**
Pay scale Rs. 1000-50-1500 plus dearness allowance as per rules.
Qualifications A good basic postgraduate Degree in Social Work. A doctroal degree preferred.
Experience: At least ten years teaching experience in Social Work at the postgraduate level and acknowledged contribution to Social Work literature and/or Social Work practice.
Duties: Candidate selected will be expected to engage in teaching, research, research guidance etc. in his field specialisation. He may also be expected to accept responsibility for coordination and organization of work of other colleagues.

2 Professor of Social Science (Economics)
PayScaleRs. 1000-50-1500 plus dearness allowances as per rules.
Qualifications A good basic postgraduate Degree in Economics. A doctoral degree preferred.
Experience At least ten years teaching experience at the postgraduate level and acknowledged contribution to economics.

Duties: Candidate selected will be expected to teach courses in Indian Economics, Trade Unionism, Planning etc. and undertake research in the area of labour organisation and Industrial relations. He will also guide students in their research work.

3 **Lecturer**, one each for the Departments of Family and Child Welfare, Medical and Psychiatric Social Work, Criminology and Corrections, and Urban Community Development.
Pay Scales Rs. 450-25-600-RB-30-840 plus dearness allowances as per rules.
Experience Two years teaching/research/field work supervisory experience at the postgraduate level.

Duties: Candidate selected will be expected to engage in teaching, research guidance and field work supervision in the area of his competence.

Lecturer in Statistics.
Pay Scale Rs. 450-25-600-EB-30-840 plus dearness allowance as per rules.
Qualifications A high second class Master's Degree in Statistics. Knowledge of machine processing of data would be an additional qualifications. Age limit: 25 to 40.
Experience At least two years teaching research experience at the postgraduate level.

Duties: Candidate selected will be expected to teach statistics, help develop social statistics at the Institute and give assistance in the formulation of research designs.

5. Lecturer in Social Work
Pay Scale Rs. 450-25-600-EB-30-840 plus dearness allowance as per rules.
Qualifications
At least a high second class Master's Degree or postgraduate Diploma in Social Work. Age limit: 25 to 40.
Experience Two years teaching /research/field work supervisory experience at the post-graduate level.

Duties: Candidate selected will be expected to teach courses in History, Philosophy and Field of Social Work, Social Weflare Administration etc.

6. **Faculty/Field work Assistants** one each for the Departments of Medical and Psychiatric Social Work, Urban Community Development, and Personnel Management and Labour Welfare, and two for the Department of Criminology and Correction.
Pay Scale Rs. 260-20-400-25-550 plus dearness allowance as per rules.
Qualifications Must be a holder of good postgraduate Degree or Diploma in Social Work with specialisation in the respective fields. Age limit: 23 to 30.
Experience Some practical experience in the respective fields.

Duties: Candidates selected will be expected to supervise the field work of students and assist in the academic work of the respective Departments of the Institute.

7. **Research Assistants**
Pay Scale
Rs. 260-20-400-25-500 plus dearness allowance as per rules.
Experience
Work experience in the field desirable.
Duties: Candidates selected will help in the planning and execution of research projects and in supervising research laboratory work of students.

Qualifications relaxable; higher start possible. The prescribed forms may be obtained from the Registrar s office either personally or by sending a self-addressed envelope (9″x4″) *with stamps worth Re.* 1/-. *Candidates called for an interview will have to appear in Bombay at their own expense. The last date for receipt of applications in the prescribed form is February* 7, 1968.

N.C.A.E.R. PUBLICATIONS

1.	Techno-Economic Survey of NEFA	Rs. 20.00
2.	Regional Transport Survey of Madras and Pondicherry.	Rs. 30.00
3.	Export Prospects of Diesel Engines	Rs. 15.00
4.	Patterns of Income Distribution and Saving (Occasional Paper No. 21)	Rs. 4.00
5.	Towards a Self-Reliant Economy (Occasional Paper No. 22)	Rs. 2.50
6.	Pesticides in Indian Agriculture	Rs. 18.00
7.	Wage Difference in Indian Industry	Rs. 24.00
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